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Effects of submaximal aerobic training in combinations with yogic practices on selected physiological and hormonal variables among people with hypothyroidism

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Abstract

To achieve the purpose of the study was to find out the effects of submaximal aerobic training in combination with yogic practices on selected physiological and hormonal variables among people with hypothyroidism. To achieve the purpose of the study, forty five subjects were selected at randomly, their age ranged from 30 to 45 years. The study was conducted on 45 subjects from Thyrocare centre, Coimbatore. The selected subjects were divided into three equal groups consisting of fifteen each. No attempt was made to equate the groups. Experimental Group I underwent the Submaximal aerobic Training group (SATG), Experimental Group II underwent the Submaximal aerobic Training with Yogic Practices group (SATYPG) for three days a week and for a duration of 6 weeks. Group III acted as control group (CG), the subjects in control group were not engaged in any training programme other than their regular work. At the end of the treatment period, as post-test, the subjects belonging to the treatment group namely experimental group-I Submaximal aerobic Training group (SATG), Experimental Group II – Submaximal aerobic Training with Yogic practices group (SATYPG) and group III Control Group (CG) were tested on selected variables. Further, the group mean gains pre and post-test recorded by three groups during the experimental period of six weeks to the criterion measures were tested for significance by applying 't' – test.

Keywords: Submaximal aerobic, yogic practices, hypothyroidism

1. Introduction

If food and work are either excessive or deficient, the three things enumerated by medical writers, flatulence, biliousness, and phlegm, will cause one disease.

Too much of anything is good for nothing goes a proverb that states the importance of right things at right proportions at the right time. In human body is no exception to it. Hormones are the kingmakers and man is at peace only till hormone homeostasis rules his body. Hormones are double edged sword, as its right amount is more important than mere presence or absence. In the game changer hormone thyroid always top the list of human concern. In excess it threatens with toxic symptoms like Weight gain with poor appetite, Shortness of breath, Poor memory and concentration and Abnormal sensation while in absence suppresses him with worsen symptoms. A sound mind in a sound body, thus hormone balance plays a vital role in physical, mental and financial state of a person and crippled is he with hormone imbalance.

The thyroid gland is covered by a thin fibrous sheath, the capsula glandulae thyroideae, composed of an internal and external layer. The external layer is anteriorly continuous with the pretracheal fascia and posterolaterally continuous with the carotid sheath. The gland is covered anteriorly with infrahyoid muscles and laterally with the sternocleidomastoid muscle also known as sternomastoid muscle. On the posterior side, the gland is fixed to the cricoid and tracheal cartilage and cricopharyngeus muscle by a thickening of the fascia to form the posterior suspensory ligament of thyroid gland also known as Berry's ligament (Yalçin and Ozan, 2006) [4].

From rest to maximal exercise the oxygen consumption will decrease and reaches almost 7 to 8 times more than the rest. During submaximal exercise the cardiac index decreases linearly which is caused by the increase of heart rate and stroke volume index or SVI (Sabapathy *et al.*, 2004) [3].

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The world yoga derived from the Sanskrit root 'yuj' meaning to bind, join, attach and yoke, to direct and concentrate one's attention on, to use and apply. It also means union or communion. Yoga was collated, coordinated and systematized by patanjali in his classical work, the yoga sutras, which consists of 185 terse aphorisms (Iyengar, 2008). Yoga acts preventive measures to disease by reducing stress level, keeping the internal organs toned and healthy and maintaining a balanced equilibrium between the physical, mental and spiritual level. The emphasis is to unite the system with a combination of breathing techniques, gentle exercise and mind control. This produces a tranquility that penetrates deep into the mind and soul. It improves the health of the person on all levels (Vimala Lalvani, 2003). Improvement in physiological and psychological parameters after 6 months of yoga practice; The present results suggest that regular yoga practice can improve aspects of physical and quality of life for healthy individuals. Further the result of the study showed that the submaximal aerobic training with yogic practices (SATYPG) had not produced significant improvement on selected hormonal variables namely T3 (1.17%; $p < 0.05$), T4 (0.15%; $p < 0.05$) and TSH (0.14%; $p < 0.05$) (Rocha *et al.*, 2012) [2].

The purpose of this study was to find out the effects of submaximal aerobic training in combinations with yogic practices on selected physiological and hormonal variables among people with hypothyroidism.

2. Methodology

To fulfill the purpose of the study, totally forty five male people with hypothyroidism were treated as subjects. They were selected from the organization of Thyrocare, Coimbatore, Tamilnadu. They were clinically and bio chemically confirmed, cases of hypothyroidism and their age ranged between 30 and 45 years. The subjects with any

other complications of thyroidism were excluded. Only the hypothyroidism subjects who were willing to participate in the experimental study were included in this study.

The study was formulated as a pretest and posttest random group design, in which forty five male people with hypothyroidism were randomly assigned in to three groups namely Experimental group-I submaximal aerobic training (SATG), Experimental group-II submaximal aerobic training with yogic practices training (SATYPG), group-III Control Group (CG). Each group consists of 15 subjects. No attempt was made to equate the groups. The selected subjects were initially tested on criterion variables used in this study and this was considered as the pre-test. After assessing the pre-test, the subjects belonging to Experimental Group I underwent the training of submaximal aerobic exercises (SATG), Experimental Group II underwent the training of submaximal aerobic exercises with Yogic practices (SATYPG) and Group III acted as control group (CG), the subjects in control group were not engaged in any training programme other than their regular work. The subjects were free to withdraw their consent in case of feeling any discomfort during the period of their participation but there was no dropout during the study. After six weeks of their training programme again the subjects were tested on the same criterion variables as such in the pre-test and considered this as the post-test. Further, the group mean gains pre and posttest recorded by three groups during the experimental period of six weeks to the criterion measures were tested for significance by applying student's 't' – test.

3. Results and Discussion

All the subjects were tested on selected criterion variable prior to and immediately after the training period. The collected data will be comparing on balance to analyses in "t- ratio" will be used in 0.05 level of confidence.

Table I: Pre Test and Post Test Mean Values of Submaximal Aerobic Training Group on Selected Physiological and Hormonal Variables among People with Hypothyroidism

S. No	Variables	Pre test SD	Post test SD	Diff	SE	't' –ratio
1.	Systolic Blood Pressure (mm Hg)	132.80 ± 4.60	123.80 ± 4.44	9.00	1.03	8.71*
2.	Diastolic Blood Pressure (mm Hg)	92.10 ± 11.46	88.93 ± 7.99	3.17	1.94	4.11*
3.	Breath Holding Time (seconds)	26.15 ± 2.30	29.55 ± 2.41	3.40	0.42	5.74*
4.	T3 (pg/ml)	0.89 ± 0.04	0.91 ± 0.06	0.02	0.01	1.40
5.	T4 (ng/dL)	6.63 ± 0.63	6.62 ± 0.58	0.01	0.07	0.19
6.	TSH (uIU/mL)	7.30 ± 0.47	7.29 ± 0.50	0.01	0.16	0.64

*Significant at 0.05 level of confidence (1, 14), 2.048

The obtained 't' – ratios on physiological variables were greater than the critical value of 2.14 it was found to be statistically significant at 0.05 level of confidence for degrees of freedom 1 and 14. It was observed that the mean gains and losses statistically significant resulting that six weeks practice of submaximal aerobic training showed positive sign as having the significant improvement in Systolic blood pressure (6.77%; $p < 0.05$) Diastolic blood pressure (3.44%; $p < 0.05$) Breath Holding Time (13.00%; $p < 0.05$) and Six weeks practice of submaximal aerobic training showed negative sign as having the insignificant

improvement in hormonal variables T3 (2.25%; $p < 0.05$), T4 (0.15%; $p < 0.05$) and TSH (0.14%; $p < 0.05$) from the base line. The submaximal aerobic training programme has produced a significant improvement on physiological variables namely systolic blood pressure, diastolic blood pressure and breath holding time. Hence the investigator's hypothesis to this study was accepted. Further the submaximal aerobic training programme has not produced a significant improvement on hormonal variable of T3, T4 and TSH among People with hypothyroidism. Hence the investigator's hypothesis to this variable was rejected.

Table II: Pre Test and Post Test Mean Values of Submaximal Aerobic Training with Yogic Practices Group on Selected Physiological and Hormonal Variables among People with Hypothyroidism

S. No	Variables	Pre test SD	Post test SD	Diff	SE	't' -ratio
1.	Systolic Blood Pressure (mm Hg)	127.66 ± 2.43	121.40 ± 2.35	6.26	0.52	12.03*
2.	Diastolic Blood Pressure (mm Hg)	90.50 ± 8.59	85.33 ± 6.30	5.17	1.37	8.90*
3.	Breath Holding Time (seconds)	26.60 ± 1.95	32.65 ± 1.66	6.05	0.55	7.64*
4.	T3(pg/ml)	0.90 ± 0.03	0.89 ± 0.04	0.01	0.01	1.90
5.	T4 (ng/dL)	6.62 ± 0.63	6.61 ± 0.52	0.01	0.11	1.22
6.	TSH (uIU/mL)	7.29 ± 0.51	7.28 ± 0.44	0.01	0.13	1.25

*Significant at 0.05 level of confidence (1, 14), 2.048

The obtained 't' - ratios on physiological variables were greater than the critical value of 2.14 it was found to be statistically significant at 0.05 level of confidence for degrees of freedom 1 and 14. It was observed that the mean gains and losses statistically significant resulting that six weeks practice of submaximal aerobic training with Yogic practices showed positive sign as having the significant improvement in Systolic blood pressure (4.90%; $p < 0.05$) Diastolic blood pressure (5.71%; $p < 0.05$) Breath Holding Time (22.74%; $p < 0.05$) and Six weeks practice of submaximal aerobic training showed negative sign as having the insignificant improvement in hormonal variables

T3 (1.17%; $p < 0.05$), T4 (0.15%; $p < 0.05$) and TSH (0.14%; $p < 0.05$) from the base line. The submaximal aerobic training with Yogic practices programme has produced a significant improvement on physiological variables namely systolic blood pressure, diastolic blood pressure and breath holding time. Hence the investigator's hypothesis to this study was accepted. Further the submaximal aerobic training with Yogic practices programme has not produced a significant improvement on hormonal variable of T3, T4 and TSH among People with hypothyroidism. Hence the investigator's hypothesis to this variable was rejected.

Table III: Pre Test and Post Test Mean Values of Control Group on Selected Physiological and Hormonal Variables Among people with Hypothyroidism

S. No	Variables	Pre test SD	Post test SD	Diff	SE	't' -ratio
1.	Systolic Blood Pressure (mm Hg)	136.48 ± 20.70	135.70 ± 15.00	0.78	2.49	0.58
2.	Diastolic Blood Pressure (mm Hg)	90.53 ± 10.37	92.53 ± 7.94	2.00	1.69	1.18
3.	Breath Holding Time (seconds)	26.60 ± 1.02	26.90 ± 1.01	0.30	0.43	0.67
4.	T3(pg/ml)	0.94 ± 0.02	0.95 ± 0.03	0.01	0.01	0.90
5.	T4 (ng/dL)	6.63 ± 0.50	6.64 ± 0.79	0.01	0.15	0.08
6.	TSH (uIU/mL)	7.32 ± 0.47	7.31 ± 0.50	0.01	0.15	0.25

The obtained 't' - ratios on health related physical components, variables were greater than the critical value of 2.14 it was found to be insignificant at 0.05 level of confidence for degrees of freedom 1 and 14. It was observed that the mean gains and losses insignificant resulting that the control group showed negative sign as having the insignificant improvement in Systolic blood pressure (0.57%; $p < 0.05$) Diastolic blood pressure (2.21%; $p < 0.05$) Breath Holding Time (1.13%; $p < 0.05$) and Six weeks practice of submaximal aerobic training showed negative

sign as having the insignificant improvement in hormonal variables T3 (1.05%; $p < 0.05$), T4 (0.15%; $p < 0.05$) and TSH (0.13%; $p < 0.05$) from the base line. The control group programme has not produced a significant improvement on physiological variables namely systolic blood pressure, diastolic blood pressure and breath holding time and hormonal variables namely T3, T4 and TSH among People with Hypothyroidism. Hence the investigator's hypothesis to this study was rejected.

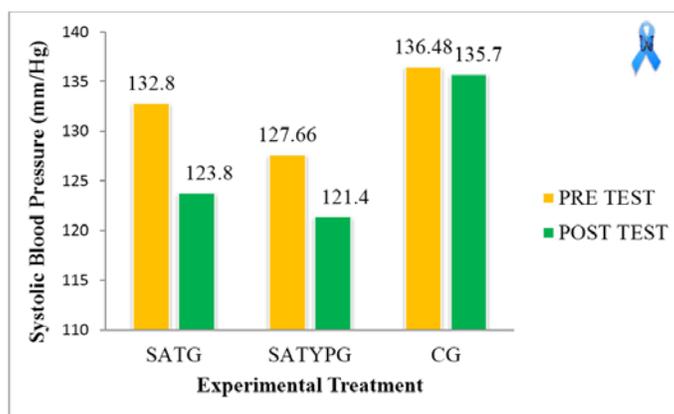


Fig 1: Graphical Representation Showing the Pre Test and Post Test Mean Values of Experimental Groups and Control Group on Systolic Blood Pressure

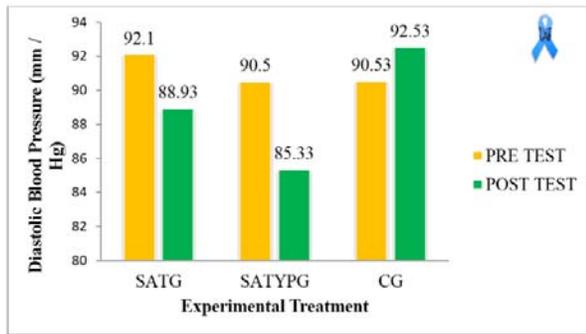


Fig 2: Graphical Representation Showing the Pre Test and Post Test Mean Values of Experimental Groups and Control Group on Diastolic Blood Pressure

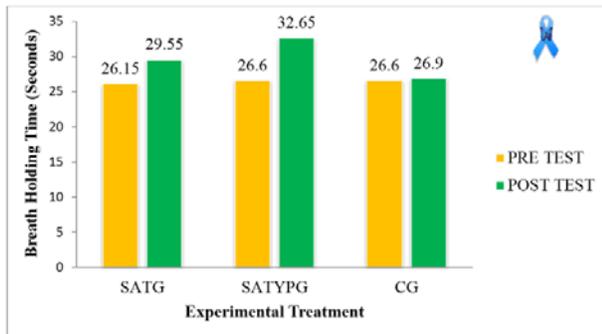


Fig 3: Graphical Representation Showing the Pre Test and Post Test Mean Values of Experimental Groups and Control Group on Breath Holding Time

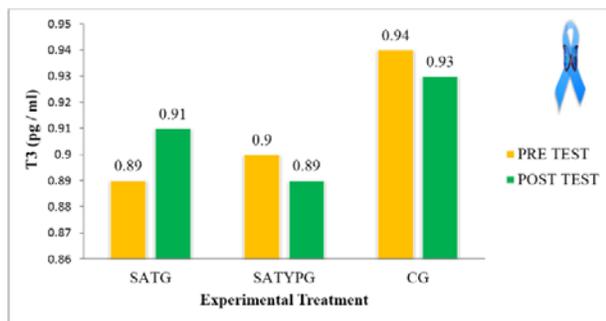


Fig 4: Graphical Representation Showing the Pre Test and Post Test Mean Values of Experimental Groups and Control Group on T3

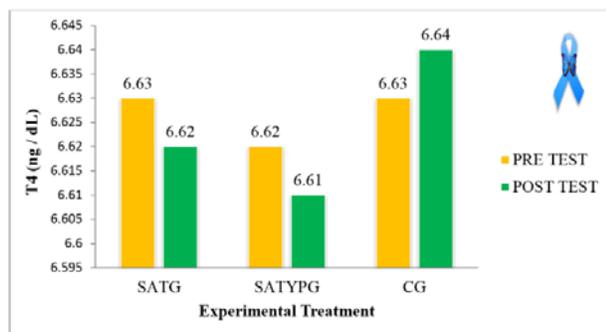


Fig 5: Graphical Representation Showing the Pre Test and Post Test Mean Values of Experimental Groups and Control Group on T4

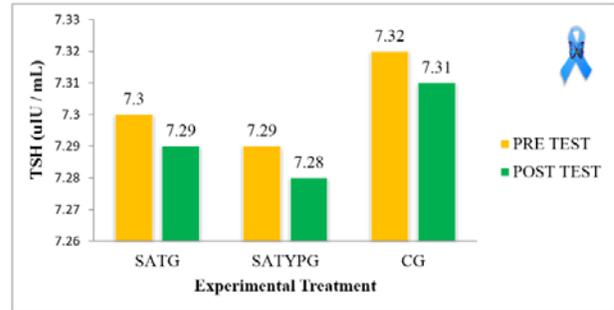


Fig 6: Graphical Representation Showing the Pre Test and Post Test Mean Values of Experimental Groups and Control Group on Tsh

4. Discussions

- ❖ The result of the study showed that the Submaximal Aerobic training (SATG) had produced a significant improvement on selected physiological variables among people with Hypothyroidism.
- ❖ The result of the study showed that the Submaximal Aerobic training with Yogic Practices (SATYPG) had produced a significant improvement on selected physiological variables among people with Hypothyroidism.

5. Conclusions

In light of the above findings of the present study the following conclusion have been made

- ❖ It was concluded that the Submaximal Aerobic training (SATG) had produced a significant improvement on selected physiological variables among people with Hypothyroidism.
- ❖ It was concluded that the Submaximal Aerobic training with Yogic Practices (SATYPG) had produced a significant improvement on selected physiological variables among people with Hypothyroidism.

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